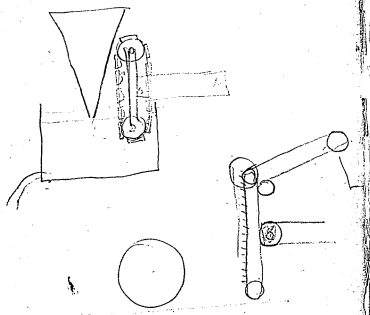
Notebook, N-89-05-18

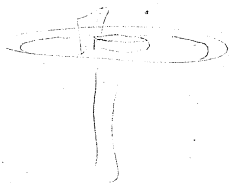
This notebook covers the period May 1889-November 1893. The first set of entries are by Edison and consists of notes and drawings regarding ore milling, including a "wet separation" process. The following entries are by Edison associate William K. L. Dickson and include notes, drawings, and calculations regarding separation and analysis of Cornwall ore. The front cover is marked "3." The inside front cover is inscribed "T A Edison May 18. 89 #549." The pages are unnumbered, and the book has been used in both directions. Approximately 50 pages have been used. Inserted into the book are 10 numbered pages containing notes, drawings, and calculations by Dickson, entitled "Final Result of Expts on Bar Magnets - Ogden."

XE 822.8 N-89-05-18

J. Adrian
May 18. 89
#549

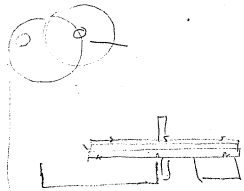
Overmilling May 18 1889
Page 4

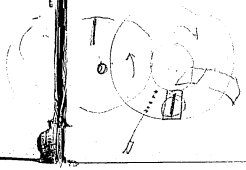




Overmulling May 18 1889

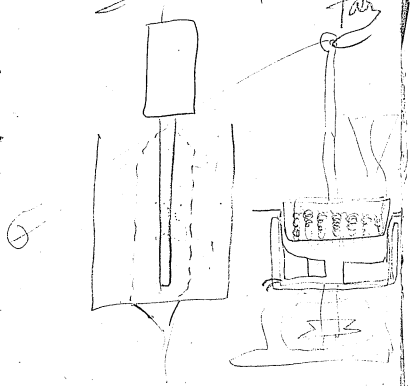
Jas

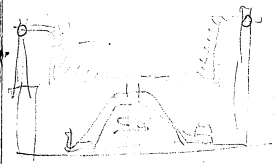


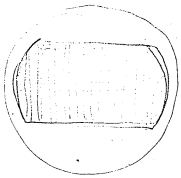


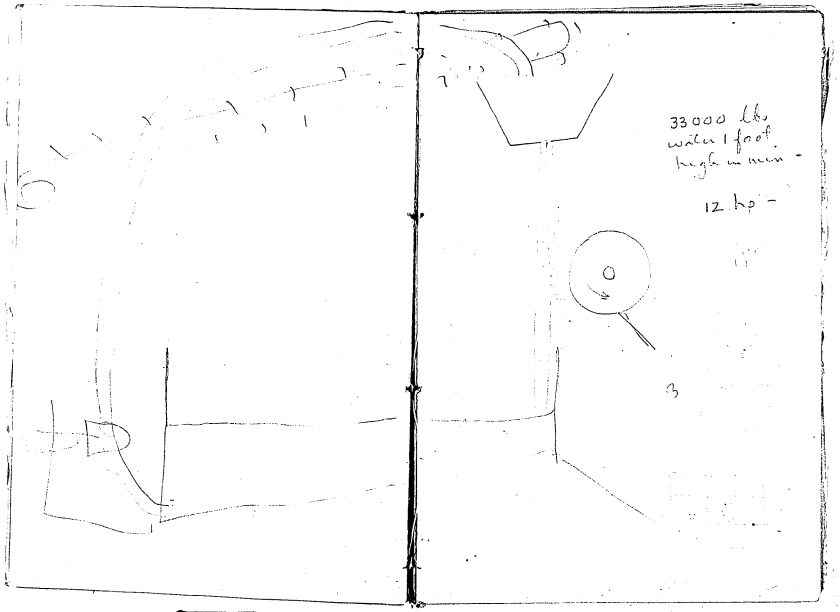
Dr Whiting May 18 1889

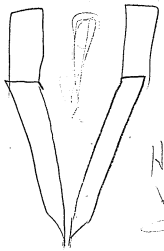
Tate








33000 lbs
within 1 foot
high in min -
12 hp -

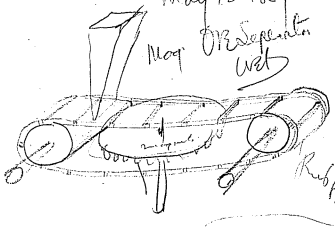


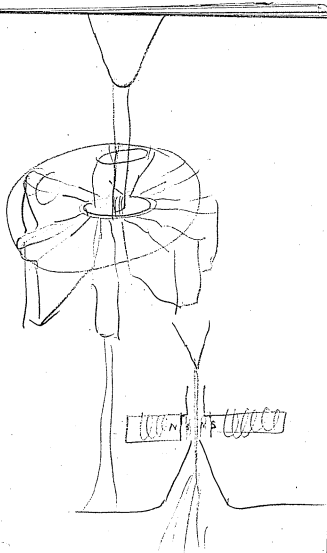
Oil Milling
May 18 1889

Hopper for wet
separation,

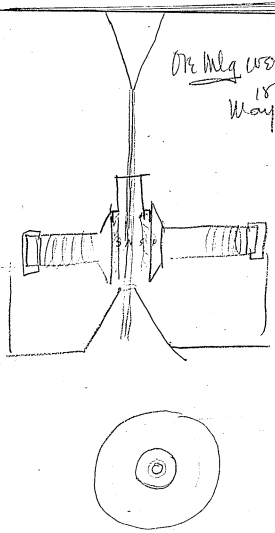
May 18 1889

May Ore Separation Wet

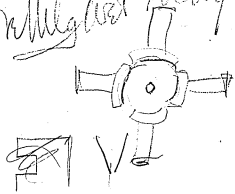


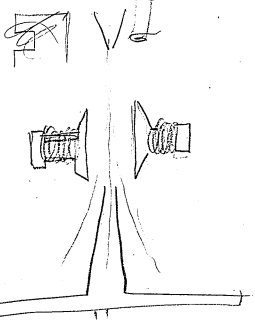

N
S
P

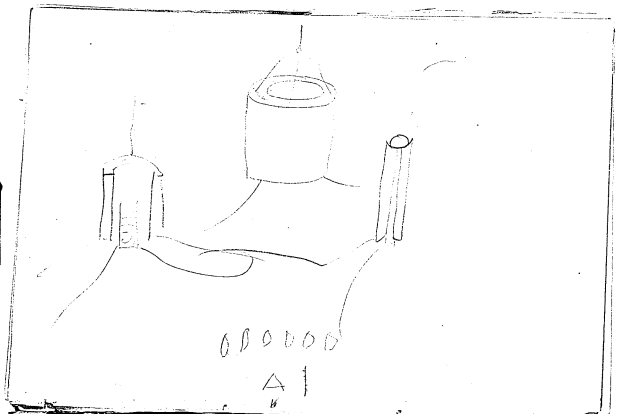
Orr Mfg Cost Sep
18
May 1889

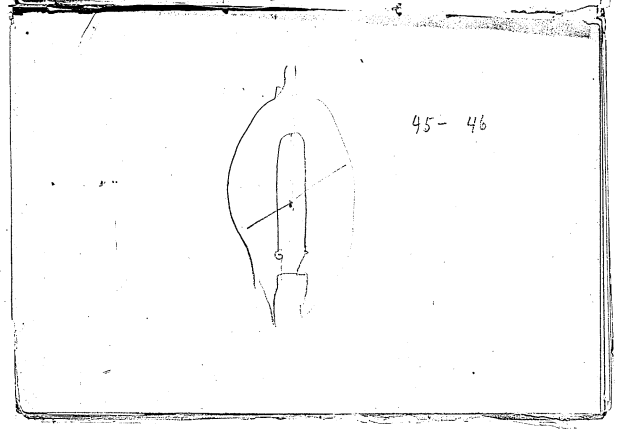


On Wednesday May 18 1887

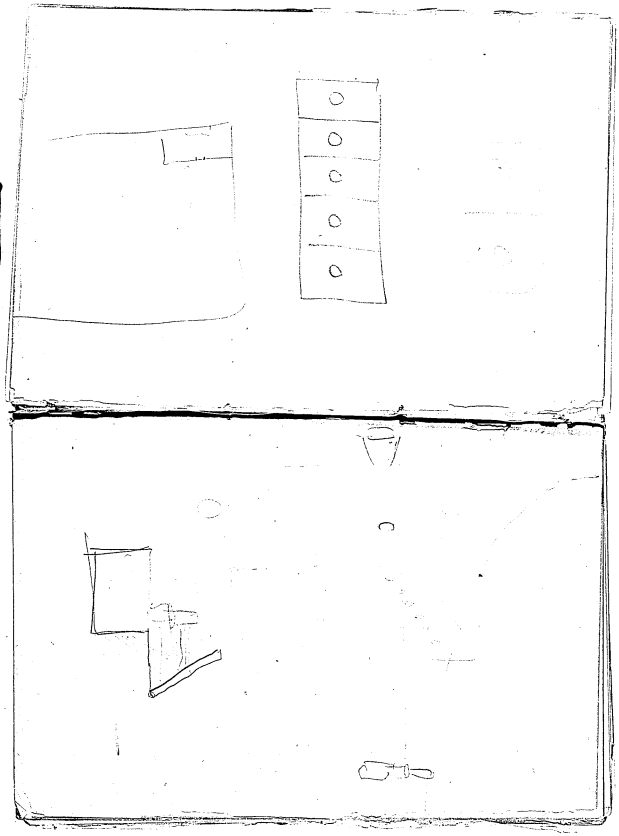


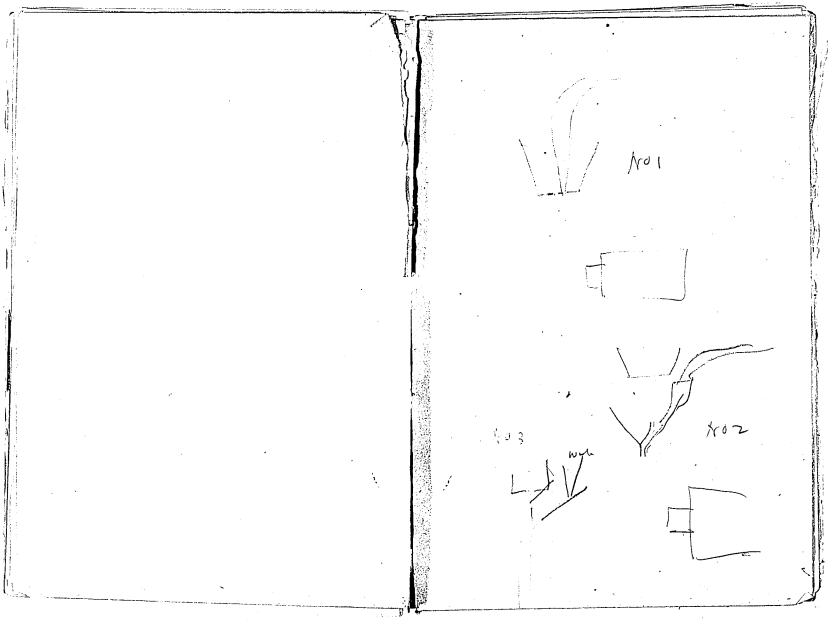


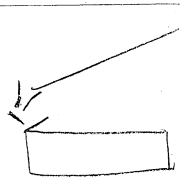




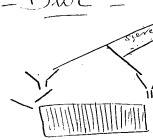
45- 46




X01
X02
X03
wpc



— Bar — Aug 3/93



lump test = Con — 48.87
1/4 ~~[illegible]~~ to 1/2" Yale, 30.14

Aug 4/93

~~Shotgun Magnet~~

Full Test fines & ace —

Con — 61.[illegible]
Yales — 49.41

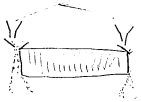
Much 20 analysis

Full Test — Weight Con - 22 lb. Yales 2½ lb.

Con — 59.72 —
Yales — 27.32 30.79
29.05 av.

whitness
not + all

Lumps 1¼" Aug 5/93



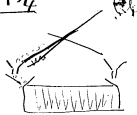
Cracked up next one –
separated fines & coarse
result – in weight
Coal – 21. lb.
Tails 3. lb.

Coal ——— 58.72
Tails ——— 18.64

[illegible]

[illegible] 90 b. 1 min.
" 54 co. 1 hour (2.4 tons)

Lumps 1¼" Aug 7/93



~~Dotto~~

Separation lump & fine
as per sketch

Weight
Coal ——— 24 lb.
Tails ——— 5¼

Analysis:–
~~Somuch~~ Coal ——— 54.84
Tails ——— 17.55

Average
Fines ——— 53.
18

Aug 30/93

coarse & fines

Aug 7/93

dotted lines shows

Partition board cannot be placed altho for lumps & fines, consequently a mixer has to be used as see dotted lines -

Weight - Con — 21 lb -
Tails — 3 lb. -

~~Zon[illegible]~~

~~Sev[illegible]~~

~~50 mesh analysis Con~~

~~Con — 49.95~~

~~Tails — 13.93~~

14

Aug 9/93

Duplicate tests

Con weight -

	Weight -	on 50 mesh
Con	29½	51.55
Tails	5½	14.29

Coarse & fine separate

	Weight -	on 50 mesh
Con	25½	~~51.945~~
Tails	6	

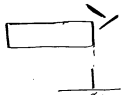
Coarse & fine together 18.90

Aug 19

Duplicate Sets

(combined — coarse & fine

Sept. 6/93



Taken separately
Fines then
coarse &
mixed for analy.

Directly under in case of fine 1½ mat. → 4m coarse

Weight Sample — 27 Con
" " " — 12½ Tails

Concen — a 50 mesh — 53.57
Tails " " " 20.81

— combined —

Concen — 54.44
Tails — 24.00

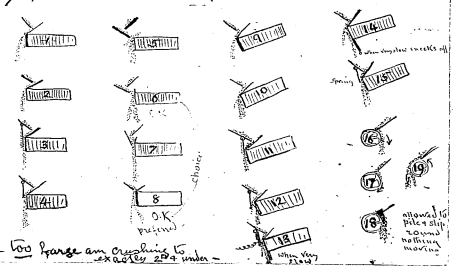
Weight con. 21½
" Tails. 7½

in a nut shell

Cornwall – Rules Exp!
(Co Normand) – Page 2 –

July 13/93

Cornwall up to date –



Are too large am crowding to exactly 2¾ inches –

Final size are – 1¼ "a gines –

See Page [illegible]

Combined fines & coarse 50 mesh analy. (Summing up)

Con 50.00 Tails 14.00 — Weight 21 lb. " 3 "

Con 52.00 Tails 18.90 — Weight 25 lb. " 6 "

Con — Tails —

Con — Tails —

Separate fines & coarse 50 mesh anal.

Con 58.72 Tails 18.64 — Weight 21 lb. " 3

Con 54.84 Tails 17.55 — Weight 24 lb. " 5 1/2

Con 57.58 Tails 14.29 — Weight 29 1/2 " 5 1/2

Con — Tails — Wash 55.04 / 17.16 } Wash 51.04

Capacity 9 ton per side per 8

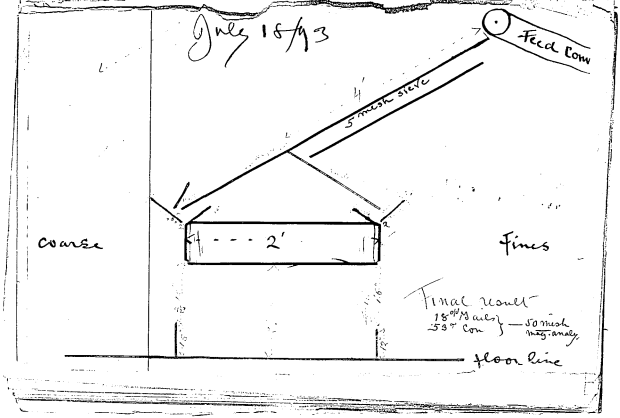
combined but stirking centre of mag.

Con 54.74 Tails 24.00 — Weight 21 1/2 lb. " 7 1/2 "

Ditto but separate concentration (Separate separation of concentration.)

Con 53.57 Tails 20.57 — Weight 27 " 12 1/2

July 18/93



Final result
18.04 Tailing
53.5 Con } 50 mesh mag. analy

16th Sept/73

Test.

50 wash meal

Weight Corn 34 lb. — % Iron 55.74
" Tails 16 — " 30.76

Sieving the one fines one side & coarse on the other

Test

50 meal meal

Weight Corn — 33 — % of Iron 55.64
" Tails — 19 31.85

the line for coarse in for fines

one set of 1 for coarse

other line for fines

3d Test

Sept 15/c

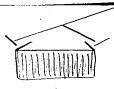
Coarse ½" only

Lining ½" in

Coweight - 3 ~~25~~ 26½ - 55 74

" 12 - 27.14

Sept 16/92



Coweight 8 9 - 59.39

" 12½ - 31.49

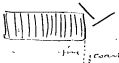
4th Test -

Sept 15/c

Coweight Coarse 2 2 - 57.55

" Fine 9 - 32.0

Sept 16/93



Lining ½" coarse

Weight - Coarse - 2 4 - 39.54

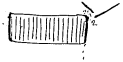
" Fine 7 - 30.43

Providing

Lines on the line - plumb -

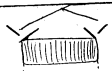
Coarse 1½" out

Sept 18



weight Con - 30 ft - 58.28
" Tails 6 — 28.68

Sept 18/93

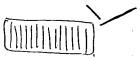


weight Con 93½ — 58.28
" Tails 6½ — 26.60

next #10	weight-Con - 32½ - 55.40	
	" Tails - 6½ - 24.25	

8th Test

Sept 1



~~weight Con~~

weight-Con - — 24 - 58.64
" Tails — 8 — 29.32

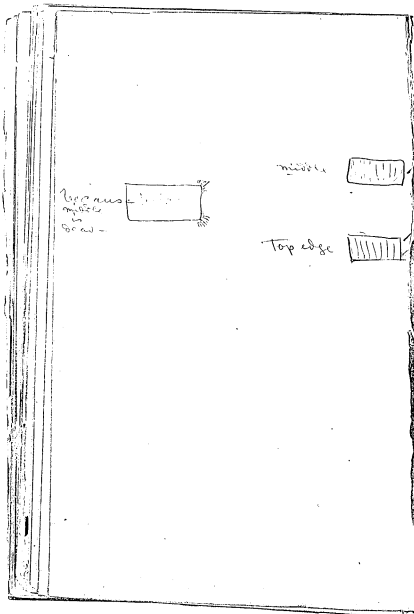
Better results with board slide nearer to the centre is clear —

Test I

The concept is to use water [illegible] — [illegible] pumps

[illegible] from the top to the bottom [illegible] - some loss - [illegible]

[illegible] with Tails —



Averages
are varying explains the
changes in %

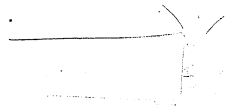
Weight Coin	Weight Dacs	Analysis Coin	Dacs	Weight Coin	Weight Dacs	Analy. Coin	Dacs
33	19	58.64	31.55	34	16	5.574	30.7
22	9	57.53	32.03	26½	12	5.574	27.1
27	7	59.54	30.43	39	12½	5.784	31.0
				33½	6½	5.874	26.6
30½	6	58.28	28.68	32½	6½	5.540	24.7
27	8	58.64	29.32				
139½	49	292.65	152.31	165½	53½	28.455	140.2
Approx. averages	7.100	av. 58.8	av. 58.53	30.46	av. 33.100	av. 10.700	av. 5.691	av. 28.04

% difference by
10 Samples Washing:-

57.22
51.80
Diff. 5.42

not Washed aver. 57.22 Washed 51.80

The above all were separate separate times & coins. ecc.



$1\frac{1}{4}$ 1 3/4 1/2 $\frac{1}{4}$

4 fence

Sept 19/93

Crushed up lots of Cornwall ore – dried by heat & got ready for a series of 2x1.6

ore w^d change be alike throughout tests

Sieving out to 3 or 4 sizes

= fines 27 lb.
¼" 19½
½" 46"

1" = 138 lb.
over 1" 45.

Cornwall Continued.

Fines

Nov. 23 1903

The following Expts were all made under the same conditions as noted –

Collomedge – Dividn plumb – with face of magnet

	Weight			Anal.	
Fines =	Con	22 – Tails	2½ =	Con = 61 –	Tails 4.18
resegg. con =	"	21 "	2½ =	63.16	—

	Weight		Anal.	
¼ =	Con	Tails	Con	Tails
	18 –	3½	50.31	12.12

	Weight			
½ =	Con	Tails	Con	Tails
	17 –	6 –	50.13.	23.89

1" Weight Con - Tails	Con	Tails
18½ 5 -	42.71	27.32

1½ Weight Con. Tails.		
17 - 6 =	44.70	33.66

av. First 3 samples both methods on a Tails.

Con = 53.84	Con = 57.92
Tails = 13.39	Tails = 17.74

Ore = 47.00

Washed figure } = 43.50

Recapitulation Sep 25-9 of Sept 21 Expts

Bottom Edge Slide — Divisor plumb with edge of magnet

		Av. weight	anal.
Times:-	Con	22½ -	61.
	Tail	2. -	4.16
¼" :-	Con	18 -	50.31
	Tail	3½ -	12.12
½" :-	Con	17 -	50.13
	Tail	6 -	23.89
1" :-	Con	18½ -	43.90
	Tail	5 -	27.32
1¼+ :-	Con	17 -	44.70
	Tail	6 -	33.66
not washed average	Con	- - -	50.00
washed aver.	Con	-	46.00

Slide near top edge mag. — Divisor Plumb.

Times:-	Con	26 - 61.9
	Tail	2½ - 5.24
¼" :-	Con	14 - 56.10
	Tail	4½ - 21.17
½ :-	Con	15 - 55.77
	Tail	6½ - 26.81

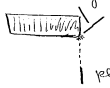
av. Con = 57.92

Roasted Cornwall

Sent us Oct 9th/93 from Cornwall Pa

Crushed to 8 mesh.

Separated on bar magnet - bottom edge —



1st Sep.

	lbs.	o/o
Con - weighing Con		58.46
Tailg - " 1½ Tail		12.33

2 Sep. of con #1 -

Con weight - ½ Con -		61.35
Tail " ½ Tail -		26.06.

Oct. 10 93

	weight	o/o
Con.	7½	57.12
Tail.	1	~~8.58~~

~~8.58~~

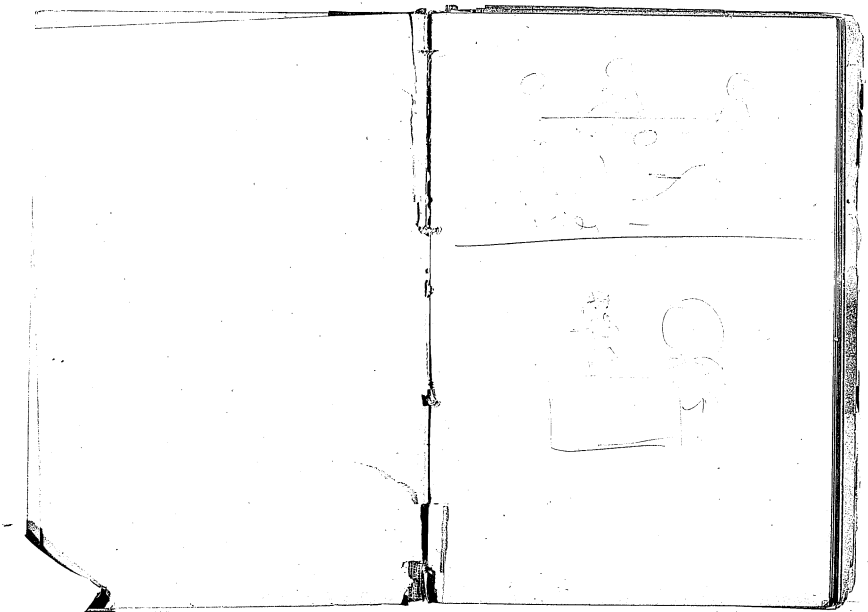
[THIS BOOK WAS USED IN BOTH DIRECTIONS. THE FOLLOWING PAGES WERE FILMED FROM THE BACK END FORWARD.]

1 – Carbon from Eck coll, 20 parts, 1½ parts A – (3 water add)

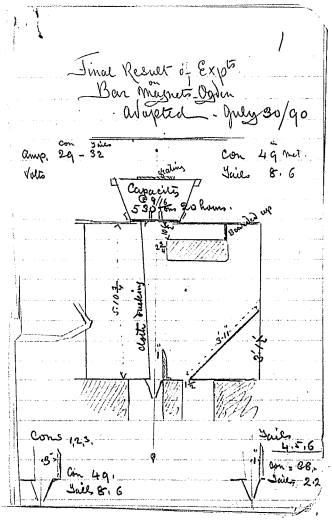
2 – Silicium – ~~[illegible]~~ – use water 2 parts to 1 of this

3 (Blair) (equal parts) no water –

4 East mass



[ITEM FOUND IN BOOK]



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Notes Daily Tests 2

Belt Machines high feed — Mar. 25 91
Con f. 2nd Stock House 69.75
Tails " " 3.50

Belt Machines high feed — Mar. 26/91
Con f. 2nd Stock House 69.2
Tails f. 1st mach. sifting into 0 mach = .90

Belt Machines high feed — Mar. 27/91
Con f. 2nd stock house — 69.28
Tails —

Average of 5 machines taken separately then mixed & analysed = 2.2

Bar Magnets: — Mar. 25/91
crude going in = 22.05
Tails # 4 — = 2.02

Bar magnet: — Mar. 26 91
Tails # 5 — = 4.27
" " # 4 — = 5.17

[ITEM FOUND IN BOOK]

"Experiment"

Compar. Test bet. 28 & 32 amp
on Tail Machine 4,5.

Bar magnets - -		Mar. 26/91
11 8 am	= 28 amp.	7.6
" "	32 "	6.4

Air Dynamo Cable Measurt

8. am. -	9 amp.	1.52
12. pm	" "	6.4
2 pm.	4 -	2.17
	5 -	1.55

Experiment.

Comp. Test bet. full & ½ field
Belt-Machines

Belt Machine -		Mar 28/91
½ field -	Say 1½ Tons pr horse power	70.01
full field -	" 2½ " " " "	69.28

Belt-Machines -		Mar. 30 91.
Con		69.4
Tails		2.53
Belt-Machines -		Mar 31 91
Con.		69.5
Tails		
Belt-Machine		April 1st
Con.	-	70.1
Tails	-	
Belt-machin		Apr. 2/91
Con		69.5
Tails.		2.2
Bar Magnet - Tails (8 amps)		4.35

Best Machine April 8/91
Laid 9.1

Remic Experiment Ap. 2/91
Comparative richness of Dust & the Reg. crude 14 mesh ore

Crude 14 mesh ore " 23.89
" Dust — " 14.66

Damp Day may explain large difference between ore 14 mesh & the floating Dust.

Whinleigh Ap. 8 & 9th/91. 4

Conclusive Exp. on Dust Machine
To determine quality & capacity of Dust on etc –

Crude Dust coming in = 245 lbs in 4 min or
61.2 lbs in 1 min = 3672 lb an hour
quality { Con –
Tails –

Capacity:
Concentrates heaviest (as possible really)
Double as much as it would take on few mag nets =
16 lb. in 5 min = 3.2 an min or
192 lbs. per hour of a
15 % ore –

% Iron in Dust – – – – – – – – – 15 %

41.6 lb Con per min

Another Test. Ap. 9th/91
Same as last -

Dust coming in today = 82.5 lbs per min
or 1950 lbs per hour -

one whirligig machine will take care of nearly all the dust tho' a little overcrowded -
see Tails:-

Con = 70.14
Tails = 7.89

Two machines one whirl. & one plain give:-

whirligig attached Con. - 70.12
" Tails. 5.10

Damp dust. gives poor con & low Cap. great difference when dried - one machine will take care of all dust perhaps - unsteady, jerky feed causes heavier bottom

Ap 3rd/91

Con taken off Belt going to Stock house #2 = 70.05
" " " Stock house #1 sell (#2) = 70.02

Ap. 4th/91

Con 1st Mill = 49.6
Tail Dump " " = 5.01
one dump. (daily average -)

Ap. 4th

Con #2 Mill = 69.4
" fp. " " = 69.6

Ap. 6/91

Con #2 Mill = 69.9
Con Stock #1 = 47.78
Tail Dump #1 = 2.53
one in morning ran about 47.
and about in Tails " 1.5

Ap. 7th/91

Last night's run av. Con #2 Stock. 69.7

- over -

[ITEM FOUND IN BOOK]

Ap 7/91

Tails #1 Dump. Very Damp. 6.3

Con #2 Stock (Taken @ 1 pm.) 70.3

Stopped some carts going to crusher & found ore to be 6th moisture. (wet & in -

Con Stock #1 = 40.4

Tail Dump #1 = about 10.%

Had them stop pulling in this fine wet ore - result after several hours rose to its normal standard.

Ap 8/91

Con Stock #2. = 69.7

heavy feed. !

Dump #1 - 11.30 am = 6.1

" " " 1.30 = 4.71

" " " 2.30 = 4.85

" " " 3.30 4.7

Very damp commencement -

During night - av. Ap 8 - 91.

Av. Con #2 Stock Taken Very hom 69.1

Tails #2 " av. 2.06

Con Stock #2 - fed feed - 69.86 @ 2.30 p.m.

5 to the spud

Averages

Con of 17 Readings #2 Stock = 69.74

Tails " 8 " " " 2.26

- Working well -

Tails. av. 2.5%

Dust Machines with whirligig attach meet highest possible capacity. as gives Con. 2/6 lb an hom a per min. 4.16

Dust coming in 2465.6 lb an hr fr hom 3.5%

Dust per 10 h. -

Con " " " -

[ITEM FOUND IN BOOK]

Con. per min. 4.6 – per hour = 276 lbs.
Dust coming in 59.2 amin p. hour = 3552

Mitchell #1 Mill

low amperes – cannot raise
owing to excessive heat – must
be wound differently –

Screens broken, full of holes
50, 14, & 12 meshes used in one –
extremes. 50 to 12 too much fines for
bar separation – quickly packs with
the slightest moisture, separating badly,
result

Slot choked with ores
See Notes –

Ogden Report June 25/91

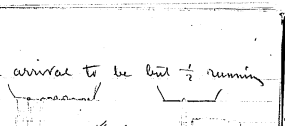
Found the following immediately on
arrivae –
#1 & #6 only running
#2 & 4 being rewound –
#3 in working order – #5 crossed up.

Amperes all running at 25 to 26
both on 1, & 6
They cannot keep up amp to 32
on Tail machines for fear of burning
out, especially in warm weather.
Temp at 10 am. (3 h. run) of
Bar magnet iron core was too hot
to put hand on – they cannot
strand (as wound) the boxing in and
Canvas pain etc in hot weather –
603.

Tail mach. #6 I found immediately

[ITEM FOUND IN BOOK]

on arrival to be but ½ running



man at other end at #1
I took samples & 20 min
later went for the man. he
was wrestling with rocks in
slot #1 which had fallen
over edge & even between
the ½" grating placed there
supposed to keep out rocks
½" & going thro'. all this
was shovelled out of
the following run was
made today
Over on 22.75 – Over. Con 43.35 ar. J. ad 4

#6 { Con 28.96
rocks 4.76

8

The #6 Tailing parting board
was changed during the wet
spell of (9.mo.30) from 1" to ½
reducing tails to ½" from about 10"
Con watched under these
circumstances – is so now –

The machines are run now at 25 amp
& 140 V. – They vary from
28 Monday to 25 Sat.

Too many cracks & holes in
screens varying from 1" down
& a large number 50 mesh plates
used giving far too many fines
to be sep. by wet machines
they can cut up to 14 mesh so
put in 50 mesh & ⅛" mesh (12 mesh)

[ITEM FOUND IN BOOK]

next to screw

Main trouble I consider is in the magnets, the impossibility as they claim to keep them up to 32 amp. Any moment Mr. Irvin says I do agree with him. Mr. Edison may expect a Telegram "magnets burnt out. Mill & Shut Shut down"

The next main trouble lies in screws, rods falling into slot - & loosening the stream -

* 6 machine

Side Test made to prove necessity of high amp. on magnets, using 10 ohm for 1 hour varied gradually from:

& 6 machine			
crudup	27 amp.	=	2.17 in Inches
	25 "	=	7

9

Temp. Test made during hot weather May 18th on 25 magnet.

Temp. in Room =	95° Fah.
" of magnet	158 " (70 C)

Whiskers normal -

One has been two wet for whiskers - when the 9.33 & 5 Inches occurred the one was so wet as to stick together in lumps -

June 24th Test made =

Crude -	20.13
Con -	41.79
Dials -	5.61

[ITEM FOUND IN BOOK]

found no grating on # 6 or
Admiral & slot almost
entirely closed up as mentioned
before with rocks -

Shoot nut hoppers only
used - slot wheel never
used - in fact cannot as
teeth have been broken off
in the effort to open a chamber
gate - gate & under the pressure
etc it -

Canvas. hooks cut
thus in some - other
not carried out for brass
hooking -

Res boxes used as often
as possible to keep from heat
doors left open -

10

No signs or rules put
up anywhere -

~~Shut trays not put in order (base of canvas hooking)~~

Wire for # 2 magnet just
arr.: # 2 mag will be
rewound by tomorrow night
4. half rewound will be
finished Sat.
Mr Linn says you need not
be alarmed -

Electric heaters or screens needed